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EXAMINER

GREEN, RICHARD R

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/581,328	Applicant(s) MUHLTHALER ET AL.	
	Examiner Richard R. Green	Art Unit 3644	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 March 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 19-22, 25 and 27-32 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 19-22, 25 and 27-32 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 20 February 2009 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Drawings

The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the embodiment comprising the cold storage unit of claims 27, 28, 30 and 31 in combination with:

the regulation device of claim 1

the temperature sensor of claim 1;

embodiment comprising the separate feed line and discharge lines of claim 29 in combination with:

the regulation device of claim 1

the temperature sensor of claim 1;

embodiment whereby the heat sink is located geodetically higher than the heat source of claim 27 in combination with the regulation device and temperature sensor of claim 1;

must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Note that the only figure to show a regulation device operatively connected to the ventilator and a regulator valve and capable of controlling both, or to show a temperature sensor is that of fig. 5. Figures 6 and 7 provide cold storage units 266, 366, and separate feed (270, 272, 282, 270, 382) and discharge (274, 276, 282, 374, 384) lines. Figures 6 and 7 have no specifically named regulation device or temperature sensor, no elements 250, 252, 350 or 352 to correspond with regulation

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device 152 or temperature sensor 150, nor devices with different names which perform or are capable of performing the same function. No figure shows the combination of elements claimed in any of claims 27-31.

The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description:

Figure 5 lacks the numeral "156" describing a control line, as stated in page 11, line 16, of the original specification. A control line from regulation device 152 to regulator valve 158 through control line 154 appears to be present in the figure.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner,

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the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

The disclosure is objected to because of the following informalities: On page 12, line 4, elements 278, 280 and 378 (by association) of fig. 6 are described as "regulation devices"; however, they are far more similar to the regulator valves 286, 158 and 386, and do not appear to serve the same function as the regulation device 152, nor are they disclosed to perform the claimed function of a "regulation device" of being operatively connected to the regulator valve and the ventilator to control both. Since the terminology is similar but the claimed functions are distinct, it would be preferred if the regulator valves 278, 280 and 378 were described in the specification as "regulator valves."

Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claim **32** is rejected under 35 U.S.C. 102(b) as being anticipated by USPN-2499736 to Kleen.

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Regarding claim **32**, Kleen teaches in fig. 6 an aircraft having a cooling device ("refrigerating system," col. 1, line 44) for expelling heat from a heat source located in the interior of an aircraft ("cargo space," col. 1, line 55) to a heat sink ("low-temperature ambient air," col. 2, lines 18-19), comprising:

a piping system sealed against the surrounding atmosphere ("hermetically confined within a closed circuit or tube" col. 1, lines 48-50), the piping system having a heat intake section 12 ("vaporizing zone," col. 1, line 52) thermally coupled with the heat source ("thermally associated," col. 1, line 52), a heat output section 11 thermally coupled with the heat sink, and an essentially adiabatic conveyance section located there between ("intermediate connecting section 13," col. 2, lines 47-48; fig. 1), whereby the piping system is filled with a heat conveyance medium ("vaporizable refrigerating medium or agent," col. 1, lines 48-49) which, when heat is received in the heat intake section from the heat source, undergoes a transition from the liquid phase to the gaseous phase, then flows into the heat output section, then condenses when discharging heat to the heat sink, and then flows back into the heat intake section (col. 3, lines 10-17);

wherein said heat sink includes a section of an external wall of the aircraft (fig. 6: the ambient air which vents through the cooling device of Kleen is the primary heat sink in the device, however a thermal couple exists between the distal end of pipe 11 and the exterior skin of the aircraft, where it is connected to the metallic skin by a metallic support—see MPEP 608.02(ix) for reference of materials indicated by cross hatching—and necessarily heat transfer will take place between the heat output pipe 11 and the

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skin of the aircraft; it is also inevitable that some heat transferred to the ambient air will be transferred back to the mouth of the exit vent, heating it, and in that manner, the section of the external wall of the aircraft around the exit of the vent duct between numerals 32 and 33 and is included in the heat sink as well; **alternatively**, the fins 14 are "walls" and are external to the compartment B; **alternatively**, the heat sink is ultimately the ambient air, but structurally the heat sink includes the duct 31 which includes some exterior surfaces of the aircraft);

at least one heat exchanger which operatively couples the piping system to one of the heat source and the heat sink, thereby to cause heat transfer in at least one of the heat intake section and the heat output section, respectively (fig. 6, at 14 and 17; col. 2, lines 52-55 teach that fins 14 act as heat exchangers for the condenser, and col. 3, lines 7-9 teach that fins 17 are heat exchangers for the evaporator); and

a ventilator operatively connected to said at least one heat exchanger, the ventilator controlling the transfer of heat between said at least one heat exchanger and said one of the heat source and the heat sink (fig. 6; ventilator may be considered as duct 31, which introduces fresh air through vent 32 and expels heated air through vent 33; col. 6, lines 44-71 teach how this is controlled).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

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invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims **19-22, 25 and 27-32** are rejected under 35 U.S.C. 103(a) as being unpatentable over USPN-5513500 to Fischer et al. in view of USPN-6658881 to Plattner.

Regarding claims **19 and 32**, Fischer et al. teach in fig. 1 an aircraft 1 with a liquid cooling system (fig. 2) for expelling heat from a heat source 8A located in the interior of the aircraft to a heat sink (either 4 or 41), comprising:

a piping system (5, 5', 6, 6', 10A, 10B, 11A, 11B) sealed against the surrounding atmosphere (col. 4, lines 41-42: at least supply 5 and return 6 conduits are insulated);

the piping system having a heat intake section 9A thermally coupled with the heat source 8A and a heat output section 4' thermally coupled with the heat sink (4 or 41) and an essentially adiabatic conveyance section (5', 6') located therebetween;

whereby the piping system is filled with a heat conveyance medium (col. 4, lines 22-24: "simple liquid coolant"; lines 37-38: "water/glycol mixture") which flows from the heat output section to the heat intake section;

wherein the heat sink includes a section of an external wall of the aircraft (col. 5, lines 43-50; heat output section 41 is a skin heat exchanger);

at least one heat exchanger which operatively couples the piping system to one of the heat source and the heat sink (heat exchanger 9A couples the piping system to the heat source 8A; col. 5, lines 25-50 teach that a heat exchanger is present at 4' and 41), thereby to cause heat transfer in at least one of the heat intake and output sections;

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a ventilator (13A or 15) operatively connected to the heat exchanger (9A OR 4') and adapted to control the transfer of heat between the exchanger and the heat source or the heat sink (col. 5, lines 8-10, lines 16-20, 61-65 discuss control of ventilators 13A and 15 to transfer heat);

a temperature sensor 45 located adjacent the heat source so as to detect the temperature thereof and operatively connected to the cooling device so that the device may respond to the temperature detected (fig. 2; col. 5, line 65 – col. 6, line 1; the sensor 45 is shown to be located inside the heat exchanger 9A, which is itself a heat source, and inside the galley 3A, but which is also considered to be adjacent to the heat source 8A);

a regulator valve 7 operatively connected to the piping system, thereby to control the quantity of heat conveyance medium flowing to or from the heat exchanger (col. 5, lines 34-36; a pump is considered capable of controlling the quantity of fluid which flows through the pump, and thus the connected piping system; a pump may be a "regulator valve"; alternatively, the fittings 30, 31, 35 and 36 are pipe fittings, which are passive valves and do control the quantity of fluid which may pass through, by nature of their cross sectional area);

a regulation device 46 operatively connected to the ventilator so as to control the ventilator according to the temperature detected by the temperature sensor (13A or 15; col. 5, line 55 – col. 6, line 1);

Fischer et al. in the above described embodiment (of fig. 2) fail to teach a regulator valve operatively connected to the regulation device, and fail to teach that the

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heat conveyance medium boils in the heat intake section 9A, or condenses in the heat output section 4', since the fluid cooling circuit outside of the box 4 in fig. 2 is a liquid cooling circuit and the water/glycol mixture does not normally undergo a phase change. Plattner does however teach in fig. 3 that a vaporizable refrigerant is used in place of the water/glycol mixture (col. 6, lines 6-8) but the embodiment of fig. 3 is an adsorption refrigeration cycle, and the medium does not condense when discharging heat to the heat sink, but rather condenses through adsorption (col. 6, lines 23-25). However, two-phase vaporization refrigeration cooling devices are known, as is their use on board aircraft (col. 5, lines 25-30 teach that in fig. 2, cooling plant 4 contains one such system).

Plattner teaches in fig. 1 a vaporization cooling device 14 with a compressor 24, condenser 12, expansion valve 20, and evaporator 22, where the heat conveying medium undergoes a phase change from liquid to gas in the evaporator and a change from gas to liquid in the condenser as it flows through the system, (col. 2, lines 51-65); in fig. 2A-2B, the condenser 12 is shown mounted on the exterior skin of an aircraft (col. 3, lines 3-13: the condenser is mounted on an external surface, shown on a lower portion thereof, but capable of being mounted "in any location on the aircraft 16 that provides sufficient air flow while not impeding the function of the aircraft 16"); the condenser further comprises a ventilator 44. It would have been obvious to a person of ordinary skill in the art at the time of the invention to implement a vaporization cooling device as in Plattner in place of the liquid cooling system of Fischer et al. because of the greater cooling capacity of harnessing the phase change of the heat conveyance

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medium, and to use the skin air condenser of Plattner in place of the skin heat exchanger of Fischer et al., to utilize the temperature differential of the ambient air at cruise altitude whenever possible, to predictably conserve fuel relative to preferentially using a separate cooling device as a heat sink.

Particular to claim **19**, neither Fischer et al. nor Plattner explicitly teach a regulator valve operatively connected to the piping system and a regulation device, where the regulation device controls the valve according to the temperature detected by a temperature sensor. However, Fischer et al. do teach that the regulating unit 46 controls "the internal refrigeration loop in the cooling plant 4," and "the external cooling air flow through the cooling plant 4 by controlling the blower 15" according to information from a temperature sensor 45 (Fischer col. 5, line 55 – col. 6, line 1). If the regulation device controls the airflow through the plant 4 by controlling the fan 15, then it would have been within the knowledge of one skilled in the art to control the flow through the piping circuit by having the regulation device control the pump 7. It would have been obvious to a person of ordinary skill in the art at the time of the invention to have the regulation device 46 control the pump 7 to control the quantity of fluid flow therethrough in response to information from the temperature sensor 45 for the purpose of having all controllable elements reactive to changes in temperature, to optimize the response of the system and maximize the cooling capacity of the device.

Regarding claim **20**, the piping system of Fischer et al. includes a closed pipe (the piping circuit is a closed circuit), one end section being the heat intake, and the other end being the heat output, whereby both sections are connected via the

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conveyance section (Fischer fig. 2: one end of the closed pipe circuit is at 9A, the heat intake, and the other end is at 4', the heat output, and conveyance 5, 5', 6, 6' connects the two).

Regarding claim **21**, the heat source of Fischer et al. includes an on-board kitchen in the aircraft (Fischer col. 3, line 63 – col. 4, line 4: galleys and food trolleys), which include surfaces requiring cooling.

Regarding claim **22**, Fischer et al. provide means for controlling the flow of the heat conveyance medium between the heat intake and output sections (Fischer et al. fig. 2: pump 7 is fully capable of controlling the flow of the medium throughout the circuit).

Regarding claim **25**, the ventilators 13A and 15 of Fischer et al. are operatively connected to the temperature sensor 45 and controlled in accordance with the temperature detected (Fischer et al. col. 5, lines 55 – col. 6, line 1).

Regarding claim **27**, Fischer et al. provide a cold storage unit between the heat source and the heat sink (Fischer et al. fig. 2: cooling unit 4 is located between the heat source 8A and the heat sink 41).

Regarding claim **28**, Fischer et al. provide a cold storage unit provided in the heat source (Fischer et al. fig. 2: the galleys 3A and 3B and trolleys 8A, 8B are quite literally cold storage units, in that they store cold food; in the sense that a particular element or medium is cold, and the trolleys may be considered as the storage unit inside the heat source of the galley proper, the air in circuit 12A or 12B will remain at its lowered temperature and provide some capacity as a heat exchanging medium for a period of

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time after the vaporization circuit shuts off; additionally, trolleys 8A contain food as taught by col. 3, lines 63-66, which food will remain cold for a portion of time even without operation of the cooling device).

Regarding claim **29**, the piping system of Fischer et al. forms a closed circuit which connects the heat source and the heat sink via a feed line 5 and a discharge line 6, respectively.

Regarding claim **30**, the cold storage unit 4 of Fischer et al. is located in a special circuit with a special piping system (col. 5, lines 25-42).

Regarding claim **31**, Fischer et al. show skin heat exchanger 41 mounted at the bottom of the aircraft when the aircraft is in rest condition, but Plattner allows for a skin condenser to be placed nearly anywhere (col. 3, lines 3-13) so long as it does not unduly affect operation of the aircraft, and in figures 7A-D, Plattner shows a similar embodiment to that of fig. 2 mounted on the top of an aircraft. It would have been obvious to a person of ordinary skill in the art at the time of the invention to mount the skin condenser of Plattner on the top of the aircraft of Fischer et al. so that it was less likely to be damaged during take-off and landing by debris kicked up by the wheels and engines, or while grounded by maintenance crew.

Response to Arguments

Applicant's arguments with respect to claims **19-22, 25 and 27-32** have been considered but are moot in view of the new ground(s) of rejection.

Regarding USPN-2499736 to Kleen, Applicant appears to hold a definition of the term "ventilator" which precludes an air duct which allows the introduction and exhaust of air from outside the system. However, there is little support for so restrictive an interpretation of the term. The heat exchanger of Kleen may exchange some heat with the air in the chamber 31 of fig. 6, but if such air is stagnant, such exchange can only occur until the air surrounding the heat exchanger is warmed to the temperature of the exchanger itself; however, the vents 32 and 33 allow outside air to flush the hot air from around the heat exchanger and introduce fresh cool air to the heat exchanger. When the aircraft is in motion, the duct 31 performs all of the functions of a ventilator, and is considered to be one. As to whether this is "a ventilator of the type recited in the claims," as Applicant questions in page 10 of the remarks of 2/20/2009, the claims recite no structure relevant to the ventilator, and define it instead by its operative connection to the heat exchanger, and its control of heat transfer; the claims do not recite a ventilator of any particular type.

Kleen may not disclose the use of an external wall of the aircraft as a heat sink; however, the claim language requires a heat sink to include a section of an external wall of the aircraft. The heat output section 11 of Kleen (fig. 6) includes heat exchanging fins 14, but is also connected at its distal end to a metallic support which is connected to the metallic skin of the aircraft (see the cross hatching in fig. 6). Metals are generally good thermal conductors and as such Kleen provides thermal coupling between the heat output section 11 and the outside skin of the aircraft. Some portion of the heat dissipated from the heat output section 11 will be absorbed by or conducted to the metal

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support, and then the skin of the aircraft. Additionally, there will be inevitable heat transfer to the louvers 33 or the skin around the duct exit. It is clear that these transfers do not constitute the primary or even intentional heat sink, but the heat sink of Kleen does include a section of an external wall of the aircraft. It is also noted that "an external wall" does not necessarily require the outermost skin of the aircraft, and any portion of the heat sink which may be called a "wall" is external to the compartment B; the fins 14, louvers 36, and the metallic distal support wall are all walls external to the compartment B.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Richard R. Green whose telephone number is (571)270-5380. The examiner can normally be reached on Monday - Thursday 8:00 am - 6:00 pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Mansen can be reached on (571)272-6608. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Rob Swiatek/
Primary Examiner, Art Unit 3643
3 June 2009

/R. R. G./
Examiner, Art Unit 3644